

Claims

1. A film forming composition comprising pullulan and a setting system.
2. The film forming composition according to claim 1,
5 wherein the setting system further comprises cations.
3. The film forming composition according to claim 2,
wherein the cations are preferably selected from the group comprising K^+ , Na^+ , Li^+ , NH_4^+ , Ca^{++} and Mg^{++} .
4. The film forming compositions according to claims 1 or 2,
10 wherein the setting system further comprises at least one sequestering agent.
5. The film forming composition according to claim 4,
wherein the at least one sequestering agent is selected from the group comprising ethylenediaminetetraacetic acid, acetic acid, boric acid, citric acid, edetic acid, gluconic acid, lactic acid, phosphoric acid, tartaric acid, or salts thereof, methaphosphates, dihydroxyethylglycine, lecithin or beta cyclodextrin.
6. The film forming composition according to any one of
15 claims 1 to 5, wherein the setting system comprises hydrocolloids.
7. The film forming composition according to claim 6,
wherein the hydrocolloids of the setting system are selected from polysaccharides.
8. The film forming composition according to one of claims
20 6 or 7, wherein the hydrocolloids of the setting system are selected from exocellular polysaccharides.

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9. The film forming composition according to any one of the preceding claims, wherein the content of pullulan is 85% to 95% by weight, and wherein the content of water is 5% to 15% by weight.
- 5 10. The film forming composition according to any one of the preceding claims, wherein the content of the cations is less than 5% by weight, preferably 0.01% to 3% by weight, more preferably 0.5% to 2% by weight.
- 10 11. The film forming composition according to any one of the preceding claims, wherein the content of the sequestering agent is less than 5% by weight, preferably 0.01% to 3% by weight, more preferably 0.5% to 2% by weight.
- 15 12. The film forming composition according to any one of claims 6 to 11, wherein the hydrocolloids of the setting system are selected from the group comprising alginates, agar gum, guar gum, locust bean gum (carob), carrageenan, tara gum, gum arabic, ghatti gum, Khaya grandifolia gum, tragacanth gum, karaya gum, pectin, arabian (araban), xanthan, gellan, starch, Konjac mannan, galactomannan, or funoran.
- 20 13. The film forming composition according to any one of claims 6 to 11, wherein the hydrocolloids of the setting system are selected from the group comprising xanthan, acetan, gellan, welan, rhamsan, furcelleran, succinoglycan, scleroglycan, schizophyllan, tamarind gum, curdlan, or dextran.
- 25 14. The film forming composition according to any one of claims 6 to 11, wherein the hydrocolloids of the setting system are selected from gellan gum or kappa-carrageenan.
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15. The film forming composition according to any one of claims 1 to 14, further containing plasticizers or/and flavoring agents.
- 5 16. The film forming composition according to claims 1 to 15, further containing colouring agents in a range from about 0% to 10% based upon the weight of the composition.
- 10 17. The film forming composition according to claim 16 wherein the colouring agent or mixture of colouring agents is selected from the group comprising azo-, quinophthalone-, triphenylmethane-, xanthene- or indigoid dyes, iron oxides or hydroxides, titanium dioxide or natural dyes.
- 15 18. The film forming composition according to claim 17 wherein the colouring agent or mixture of colouring agents is selected from the group comprising patent blue V, acid brilliant green BS, red 2G, azorubine, ponceau 4R, amaranth, D+C red 33, D+C red 22, D+C red 26, D+C red 28, D+C yellow 10, yellow 2 G, FD+C yellow 5, FD+C yellow 6, FD+C red 3, FD+C red 40, FD+C blue 1, FD+C blue 2, FD+C green 3, or brilliant black BN.
- 20 19. The film forming composition according to claim 16 wherein the colouring agent or mixture of colouring agents is selected from the group comprising carbon black, iron oxide black, iron oxide red, iron oxide yellow, titanium dioxide, riboflavin, carotenes, anthocyanines, turmeric, cochineal extract, chlorophyllin, canthaxanthin, caramel, or betanin.
- 25 20. The film forming composition according to any one of the preceding claims, wherein the composition comprises one or more surfactants.
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21. The film forming composition according to claim 20, wherein the surfactant is selected from the group comprising sodium lauryl sulphate (SLS), dioctyl sodium sulfosuccinate (DSS), benzalkonium chloride, benzethonium chloride, cetrimide (trimethyl-tetradecylammonium bromide), fatty acid sugar esters, glyceryl monooleate, polyoxyethylene sorbitan fatty acid esters, polyvinyl alcohol, dimethylpolysiloxan, sorbitan esters or lecithin.
22. The film forming composition according to any one of claims 20 or 21, wherein the content of surfactant is 0.01 to 3% by weight related to the amount of pullulan.
23. Container for unit dosage forms for agrochemicals, seeds, herbs, foodstuffs, dyestuffs, pharmaceuticals, or flavouring agents produced from the film forming composition according to any one of claims 1 to 22.
24. Container according to claim 23 which is a capsule, preferably a pharmaceutical capsule.
25. Container according to claim 23 or 24, wherein the container comprises a coating.
26. Container according to claim 25, wherein the coating is selected from the group comprising cellulose acetate phthalate, polyvinyl acetate phthalate, methacrylic acid gelatines, hypromellose phthalate, hydroxypropylmethyl cellulose phthalate hydroxyalkyl methyl cellulose phthalates, hydroxypropyl methylcellulose acetate succinate or mixtures thereof.
27. Container according to claim 25, wherein the coating is a surfactant.

28. Container according to claim 27, wherein the coating is in the range of 0.5 to 100 microns.
29. Container according to claims 27 or 28, wherein the surfactant is selected from the group comprising sodium lauryl sulphate (SLS), dioctyl sodium sulfosuccinate (DSS), benzalkonium chloride, benzethonium chloride, cetrimide (trimethyltetradecylammonium bromide), fatty acid sugar esters, glyceryl monooleate, polyoxyethylene sorbitan fatty acid esters, polyvinyl alcohol, dimethylpolysiloxan, sorbitan esters or lecithin.
30. A caplet encapsulated in a film forming composition according to one of claims 1 to 21.
31. Container comprising two halves forming a capsule, wherein the the container is sealed with one or more layers of the composition according to claims 1 to 22.
32. Container according to claim 31 wherein the capsule halves are sealed by a liquid fusion process.
33. Container according to claim 30 or 32, wherein the capsule is a container according to one of claims 23 to 25.
34. Container according to any one of claims 23 to 33 wherein a product filled in the container is releasable at a low temperature such as at room temperature.
35. An aqueous solution of the film forming composition according to any one of claims 1 to 22 for the manufacturing of capsules.

36. The aqueous solutions according to claim 35, comprising pullulan in an amount of 10 to 60%, preferably 15 to 40% by weight of the aqueous solution.
37. The aqueous solution according to claim 35 or 36, comprising setting agent in an amount of 0.01 to 5%, preferably 0.03 to 1.0% by weight of the aqueous solution.
38. The aqueous solution according to any one of claims 35 to 37, further comprising cations in an amount less than 3%, preferably 0.01 to 1% by weight of the aqueous solution.
39. The aqueous solution according to any one of claims 35 to 38, further comprising sequestering agents in an amount less than 3%, preferably 0.01 to 1% by weight of the aqueous solution.
40. Use of the aqueous solution according to any one of claims 35 to 39 for the manufacturing of hard capsules in a dip moulding process.
41. Manufacturing of hard capsules from the aqueous pullulan solution according to any one of claims 35 to 39 in a dip moulding process with conventional hard gelatine capsules process parameters and equipment.

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